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AGRICULTURE IN DENMARK, A LAND OF SPECIALIZED FARMING AND COOPERATION

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IMPORTANCE OF DANISH AGRICULTURE

In Denmark agriculture has long been the dominant activity, the chief source of wealth. At present it engages approximately thirty-five out of every one hundred workers, as compared with twenty-seven engaged in manufacturing, and eleven in trade. But many factory workers are employed in the preparation of agricultural materials, whereas others handle these products in trade. Hence agriculture is also important to the people engaged in manufacturing and commerce. In fact, the importance of agriculture to Denmark is reflected in the Danish saying: "If the farmer is prosperous, everybody is prosperous."

The Danish agriculture is not only an important means whereby people make a living within the country, but it also plays a notable rôle in the commercial world. Denmark leads all nations in the export of butter, which by reason of its high quality, is in great demand in many foreign countries, most of it being shipped to the United Kingdom. Surpassed only by the United States in the export of bacon, Denmark has also become one of the foremost producers of hog products. Hogs are raised in large numbers and consume the waste products of the dairying industry. In addition, poultry raising has proven very profitable both for domestic and foreign trade.

THE AGRICULTURAL LANDSCAPE

Since Denmark is very small in size—only about one-fifth as large as either Idaho or Utah—many people seem to believe that the landscape is practically the same in all parts of the country. Writers tend to emphasize the widespread occurrence of sandy soils to the point that one gets the impression that nothing but sand

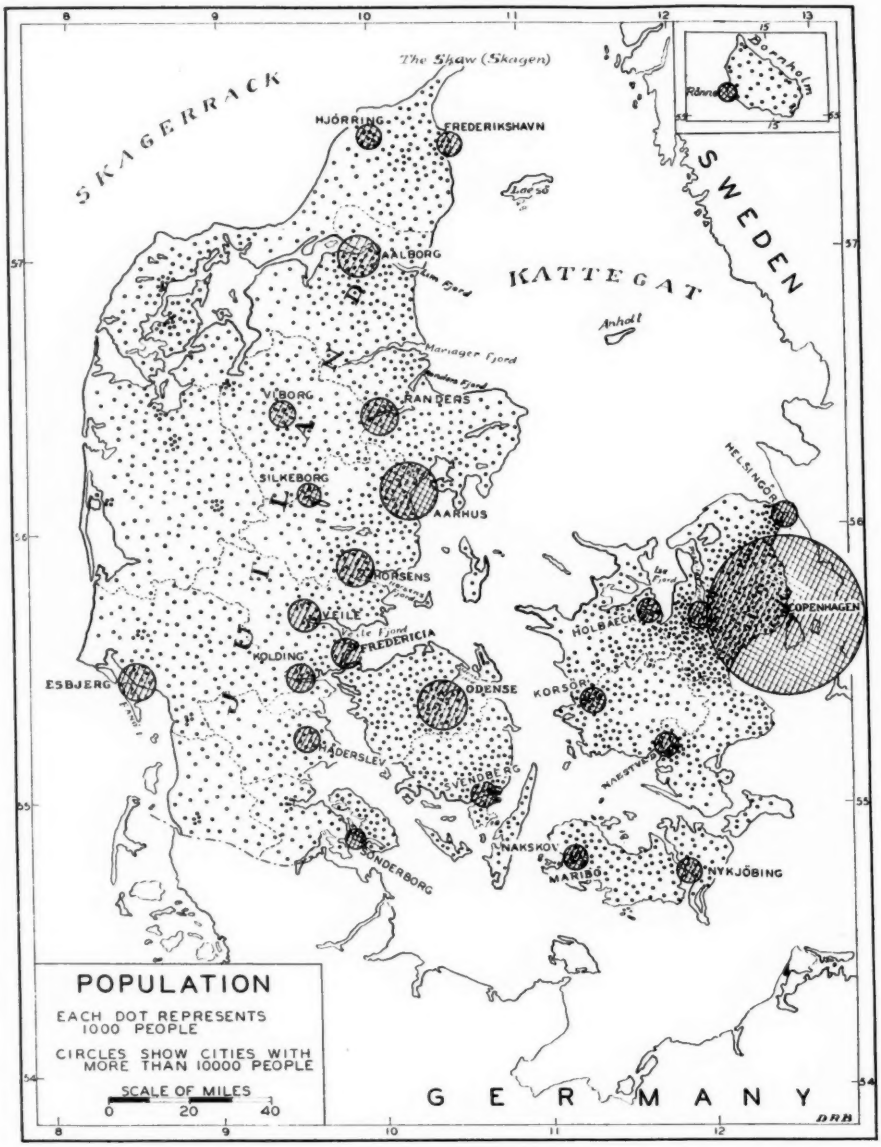

FIG. 1. Surface features and soil materials in Denmark. (After Ussing, De Geer, Anderson, and Vahl.)

covers the land surface of Denmark. Quite to the contrary, some areas have relatively heavy soils. Some parts are hilly, others are level. The agricultural landscape also varies from place to place. The sandy heather-covered plains of western Denmark present an agricultural landscape that differs strikingly from that of the east-

ern districts of the country. In the latter, clay predominates in the surface materials (Fig. 1). Moreover, the climate, altho marine in type, also varies from place to place. Western Jutland, exposed to the direct influence of the westerly winds, has a somewhat lower average seasonal range in temperature and more precipitation than one will find in eastern Jutland and in the Danish Islands. The moist, cool, harvest season of the west helps to explain the general lack of wheat culture in that area.

SAND-DUNE LANDSCAPE OF WESTERN JUTLAND

Look at Fig. 1 and you will notice that long, narrow, sand dunes extend along the western coast of Denmark. It is not surprising that many travelers have written and spoken about the sandy surface of Denmark. Foreigners entering the country from the west via Esbjerg are much impressed by the sandy character of the west-coast region. This barren dune-covered belt is more than 200 miles long and in some places stretches inland for a distance of some six to seven miles. It reaches the northernmost tip of Jutland and at the Skaw (Skagen) ends in a tiny tongue of sand. During the summer the Skaw attracts great numbers of tourists and bathers.

This dune-covered region of western Denmark is battered by the strong westerlies, which sweep unimpeded across the North Sea. It is, therefore, a region of constantly shifting sands and changing coast line. Vegetation finds it difficult to establish a foothold in the shifting sands. In some districts the winds are so strong that the peasants—such as those at Fanö—wear protective head dresses and masks. In various places along the coast the sea has broken thru the dunes, thereby forming lagoons; elsewhere submerged sand dunes cause difficulties to shipping. The coast is practically devoid of harbors, and the fishermen generally pull their boats well up on the beach. This western, wind-swept region is so dangerous to shipping that it is called the "iron coast." The scarcity of ports attests the environmental difficulties of this area. The only harbor of importance along the entire western coast of Denmark has been developed at Esbjerg, a city located to the leaward of Fanö Island. It handles a large part of the butter and bacon exports to the United Kingdom.

Agriculturally, this region is of comparatively little importance. Some grazing of livestock takes place on the small, irregular strips of land located between the sand dunes. Many of the farmers supplement their meager agricultural income by means of the fish-

eries. The small neat cottages of the fishermen nestle in the lowlands among the sand dunes.

In order that the sand dunes may be prevented from moving inland, thereby encroaching upon the fertile crop lands of the interior, grasses and trees have been planted on their slopes. One of the important tasks of the Danish Heath Society—an organization established in 1866 for the purpose of reclaiming waste land in Denmark—was to set out strips of plants that would prevent the shifting of the dunes.

The Heath Plains

To the east of the dunes lie the heath plains of Denmark. As Fig. 1 indicated, these cover a comparatively large area in western

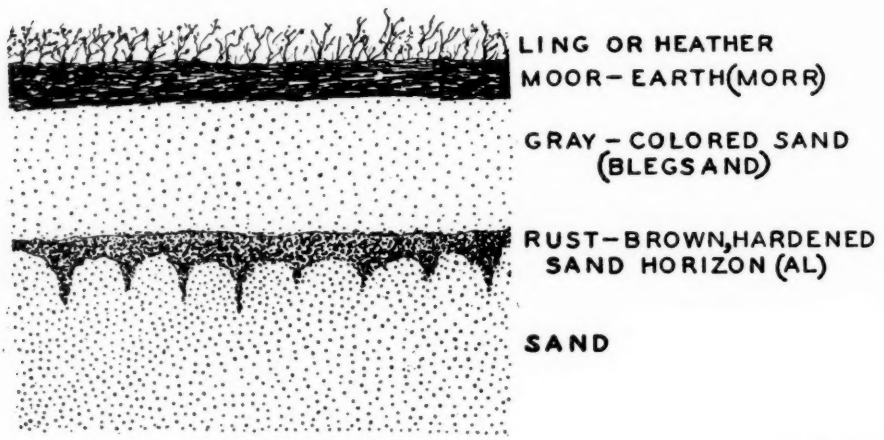

FIG. 2. A cross section or profile of the surface and sub-surface materials of the heath plains. The terms given in parentheses are Danish equivalents. (After Anderson and Vahl.)

Jutland. They were formed by sandy glacial materials carried beyond the western edge of the glacier during the last period of glaciation in northwestern Europe, and they are the largest level tracts of land in all of Denmark. In some districts the level plains are interrupted by island-like hills that were formed during earlier periods of glaciation.

The heath plains derive their name from the term "heather" or "ling," a small evergreen shrub which is the chief type of native vegetation in this region. In most parts the heather grows in moor-earth, which has been derived from the decomposed heather and forms a thin covering at the surface of the soil (Fig. 2). This layer

of moor-earth rests on sand, which by reason of its gray color, is called "pale sand" (blegsand). The waters sink thru the surface carrying acid substances from the moor-earth of the surface. These acid-charged waters dissolve the lime particles in the soil and subsoil. The heath plains are therefore lacking in lime, and, where marshy in character, they are known as "moorlands." The latter require drainage, whereas the more elevated parts of the heath plains can make good use of irrigation, especially during years of little rainfall. With the aid of drainage, irrigation, and the application of fertilizers and lime, thousands of acres of heath plain have been converted into crop land. More than one-half of the area of the heath plains has been reclaimed thru the efforts of the Danish Heath Society. In many districts heather has been plowed under and trees planted, chiefly the red pine, white pine, and mountain fir.

Altho the heath plains are better lands for agriculture than are the dune-covered areas along the western coast, they are quite inferior to the lands of eastern Denmark. They are better suited to pasture and hay than to the production of cultivated crops. Most of the small, neatly-kept farms have cows, hogs, and poultry. Cultivated crops consist mainly of oats, a cool-season crop; rye, a sandland crop; and tubers, such as turnips and potatoes.

NORTHERN JUTLAND

Study Fig. 1 and you will notice that northern Jutland is separated from the rest of the peninsula by Lim Fjord, thereby forming a large island, which ends northward in the small sandy peninsula of the Skaw (Skagen). A large part of this northern region of Denmark consists of recently elevated sea bottom. Since the last period of glaciation in Europe this area has been rising slowly and now consists in large part of land that once was covered with water. The widespread distribution of marine fossils in the soil and subsoil confirms this belief.

Just what kind of landscape would you expect to find here? Level areas much like the heath plains of western Jutland greet the eye, and like the latter are interrupted in some districts by island-like hills. However, the plains of this northern region are more productive. The ground water table is comparatively close to the surface of the soil, and the region, therefore, seldom suffers from a deficiency of water.

A study of the cultural landscape indicates that dairying is the chief activity of the region. More emphasis is placed upon the pro-

duction of hay and the maintenance of pastures than upon the growth of grain.

The small islands of Laesö and Anholt (see maps) possess natural and cultural landscapes that compare favorably with those of northern Jutland.

EASTERN JUTLAND

Unlike sandy western Jutland, the eastern part of this great Danish peninsula has a glaciated surface in which clay predominates. It is a region of till plain or ground moraine and contains

FIG. 3. Rolling landscape in Jutland. (Photo, Jonals Co., Copenhagen.)

an irregular rolling land surface. In many places the rivers and streams have cut their beds thru the glacial material and into the underlying rocks.

Contrary to general belief, the greatest elevations in Denmark are found in this eastern part of Jutland. Yet all of these heights are less than 700 feet above sea level (Fig. 3).

The coastal part of this region contains a number of fjords. These were deepened by streams which flowed westward beneath the ice during the last glacial period, when the edge of the glacier rested over central Jutland. Westward beyond the margin of the glacier these streams poured out their waters and sediments, thereby forming the heath plains of western Jutland, which we have already considered.

Even the forests of eastern Jutland present a different appear-

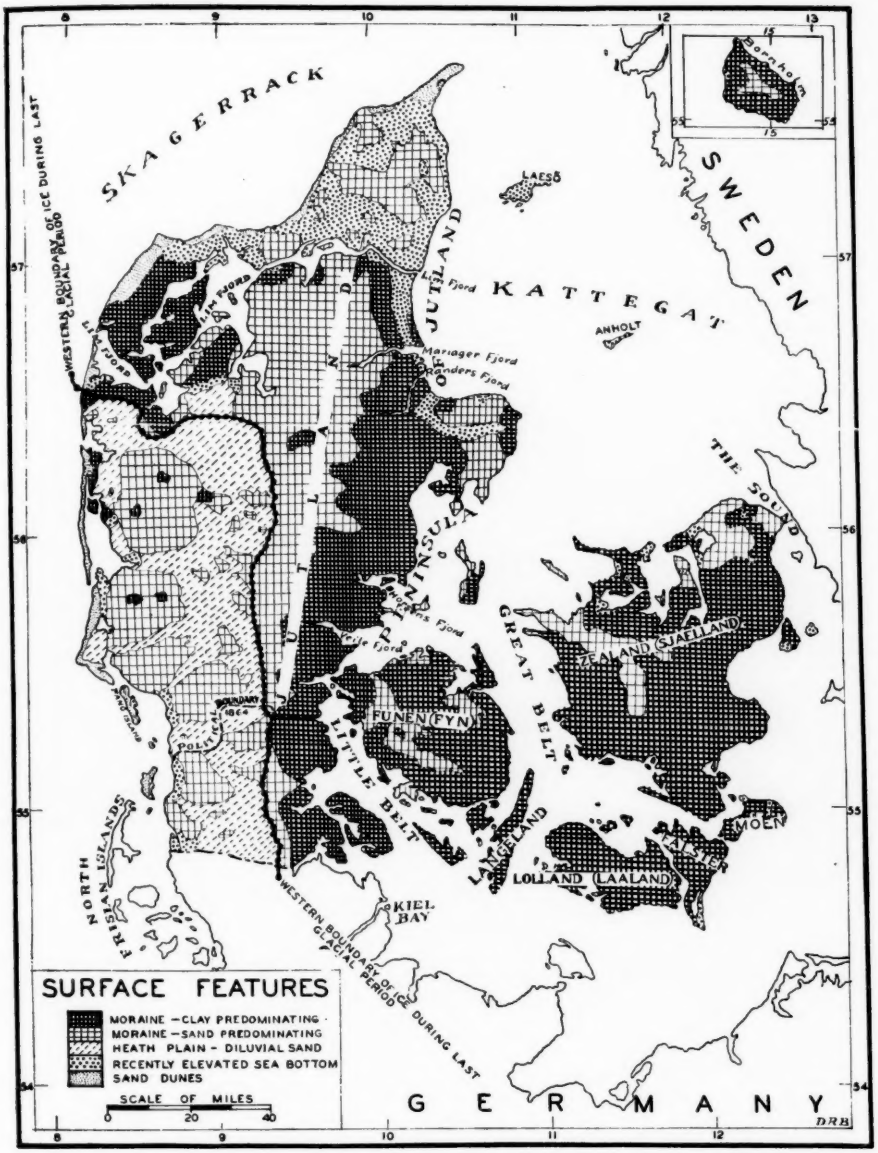

FIG. 4. Population distribution in Denmark. Note the paucity of cities in the west coast region, and the preponderance of cities in eastern Denmark and in the Danish Islands. Note also the relative importance of Copenhagen, a city that contains about one-fifth of Denmark's people. (Data obtained from Statistisk Aarbog for Denmark.)

ance from those of the western part of the peninsula, the characteristic tree being the beech.

In this eastern region one sees the typical Danish landscape with

its small farms, fertile fields, well-kept farmsteads, beech woodlands, beautiful little lakes, and rolling land surface. As compared with the western part of the peninsula, eastern Jutland depends relatively less on pastures and produces more grain. In addition to oats, barley, and rye—the most widely grown cereals in Denmark as a whole—this region grows some wheat. It is important to note that most of the world's wheat is grown on relatively heavy soil. Western Jutland is too sandy and too moist and cool during the summer half-year for successful wheat culture. The heavy soils of

FIG. 5. Landscape scene from the island of Zealand. (Photo, Jonals Co., Copenhagen.)

this eastern area and the drier harvest season favor some cultivation of this cereal. Most of the grains and tubers grown here are consumed locally by the dairy cattle, hogs, and poultry.

Study the population map (Fig. 4), and notice the relatively large number of cities in this eastern area. Many of them are located on fjords a distance inland from the coast, and they all serve their neighboring agricultural areas.

THE DANISH ISLANDS

To the east of Jutland one finds the Danish Islands, the most densely populated and fertile lands of Denmark (See population map). These islands may be classified in major groups. The westernmost of these groups consists of Fünen (Fyn) and associated

islands, such as Langeland. Fünen lies to the east of Jutland, just beyond the narrow waters of the Little Belt. It is separated from the large island of Zealand (Sjaelland) by the waters of the Great Belt. Zealand in turn is separated from southern Sweden by the Sound. These narrow ribbons of water connect the waters of the Kattegat with those of the Baltic Sea.

Study Fig. 1 and you will see that the islands are covered largely with the same type of soil material that one finds in eastern Jutland. Glacial moraine in which clay predominates is characteristic of these areas. Beech is the typical tree. There are many hills and valleys; many small farms and fertile fields (Fig. 5).

The agriculture is intensive and scientific in character. Small neat farmsteads, carefully tilled fields, well-fed cows, hogs, and poultry—these are much in evidence on the Danish Islands. On the island of Fünen houses and farmsteads are hidden among fruit trees and hop gardens. Along the roads may be seen long hedges of hassel, wild roses, and other bushes. On the islands of Lolland and Falster wheat surpasses rye in acreage. In addition, Lolland and Falster produce most of the sugar beets that are grown in Denmark. Several of the cities of these islands contain beet sugar factories. Beet waste is returned to the farms where it is used as feed by dairy cattle.

CHANGES IN DENMARK'S AGRICULTURE

Since the eighties of last century Denmark has witnessed a marked change in its agricultural industry. Even as late as 1880 Danish agriculture consisted largely of the production of grain and livestock on comparatively large farms and estates. Much wheat was grown on the estates and the fertility of the soil was diminishing rapidly. Crops were declining in yield. Exhausted soils and poor yields presented critical problems, but these were aggravated by the ever-increasing inflow of cheap grain from the virgin lands of the New World. European markets were being flooded with the cheap grain produced on the dark-colored soils of America under climatic conditions that proved very favorable for various of the cereals, especially wheat.

If the Danes had owned a large colonial empire, such as did the British, or commanded varied and abundant natural resources such as are found in Germany, they, undoubtedly, would have solved their problems in a way somewhat different from the one that was followed. But Denmark lacks rich colonies and possesses very few

natural resources other than the soil. The energetic Danes therefore decided to make the best use of their narrowly limited resources by turning from the practice of grain production and mixed farming to the dairying industry.

Denmark's soil and climate, altho but moderately well adapted to the production of grain, is excellent for the growth of forage crops. The small area of the country made it necessary for the Danes to utilize their limited area of land as intensively as possible. Dairying is an intensive phase of the livestock industry. The growing urban centers of England, Germany, Belgium, and other countries of northwestern Europe had created excellent nearby markets for dairy products. Moreover, the raising of animals would help to build and maintain the fertility of the soil.

DISTINGUISHING FEATURES OF PRESENT-DAY USE OF LAND

The present agriculture of Denmark reflects the following characteristics: (1) large proportion of cultivated land, (2) large percentage of land given to root crops and cereals, (3) abundant yields per acre, especially of cereals, root crops, and seeds, (4) great dependence upon outside feeding of livestock, and (5) the excellence of the livestock.

Approximately two-thirds of the total area of Denmark is given to crops, as compared with one-tenth in Sweden and about one-thirtieth in Norway. In many districts waste land has been reclaimed. In few lines of work has the enterprise of the Danes been more marked than in the reclamation of their heather land and in the conversion of moors and bogs into fertile fields.

In this small country good land is scarce and it is therefore devoted to the crop or crops that will yield much feed per acre of land, such as root crops and cereals. An acre of land devoted to root crops will yield twenty or more tons of cattle feed per acre, whereas the average yields per acre of hay are about one and one-half tons. Since the eighties of last century, the yields per acre of the most important livestock feeds have increased about 25 per cent.

Great economy is realized in the Danish system of outdoor feeding. In many districts cows are tethered in long lines and graze the rich pastures and meadows with the minimum amount of waste. In most countries the animals are permitted to roam at will in the pastures, thereby tramping a goodly amount of feed under their hoofs.

At present Denmark possesses a greater number of cows, hogs,

and horses than are found in either Belgium or the Netherlands. Like the livestock of the latter countries, those of Denmark are of excellent quality and breed.

A Nation of Small Independently-Owned Farms

At present about one-half of the agricultural holdings of Denmark are less than 25 acres each, and about one-fifth of them cover less than eight acres each. On the other hand, holdings of more than 640 acres each embrace less than one-tenth of the farm acreage of Denmark. From the time of the great estates, the Danes have gradually subdivided the large holdings and have made the land available to the great masses of the farm population. The aristocracy of Denmark, which for a long time controlled the Upper House of Parliament, fought vigorously against the subdivision of the land. The aristocracy also objected to the development of the credit banks, which enabled a man of good character but comparatively small means, to acquire a farm of his own. An honest farmer between the ages of 25 and 50 with four or more years of experience in agriculture, could obtain a farm on the condition that he contributed one-tenth of the cost of the land, the other nine-tenths being furnished by the state.

Thus a farm laborer could borrow up to nine-tenths of the value of the land he wanted to buy, provided the value did not exceed 20,000 kroner (one krone equals $0.22). Largely because of this policy more than ninety-two per cent of the farms are owned by the farmers themselves. Rented farms have declined from 42.5 per cent in 1850 to less than 8 per cent at present.

Capable Leaders and Education for All

Thru the efforts of capable leaders, such as Bishop Grundtvig and Kirsten Kold, education was made available to the entire Danish population. At present there is practically no illiteracy in Denmark. Bishop Grundtvig's writings had a marked influence in shaping the educational future of the country. In his philosophy, Bishop Grundtvig favored the masses, as indicated in the statement that "very few should have more than they need; and fewer still, less than they need."

Before the year 1844 the Danish system of education was formal and intended only for the upper classes or the well-to-do people of the time. But in that year Kirsten Kold, a shoemaker's son, inspired by the writings of Grundtvig, founded the first People's High

School at Rödding, Denmark. His first pupils consisted of poor farmers. From these humble beginnings grew the great system of Danish high schools, including the well-known People's High Schools (folkehöjskoler). There are about 58 of these schools in Denmark at present (1938). The special aspect of the schools is to teach pupils how to think correctly. Patriotism and sense of duty are also emphasized. The schools are attended voluntarily by young men and women between the ages of 15 and 30, most of whom are children of farmers. In addition, there are many agricultural schools and colleges. These places of learning have played an important part in the development of Danish agriculture to the high plane that it occupies in the commercial world. The foreigner who travels in Denmark becomes impressed with the generally high level of intelligence and education of the farmers.

Government Aid

The Danish farmers have received considerable assistance from their government. The subdivision of the large estates and the development of a liberal education were due in large measure to government aid, which has taken four well-defined forms (1) provision by means of State loans in the form of long-term mortgages with low interest rates, (2) liberal provision for practical education thru the People's High Schools, (3) the arrangement and maintenance of agricultural experiment stations in various parts of the country, and (4) assistance in the reclamation of land.

Cooperative Societies

While the efforts of the Danish Government have done much toward the attainment of the country's high level of agriculture, the cooperative societies have also played a vitally important rôle. Unlike the forms of government aid listed above, the cooperative societies are managed by the farmers themselves, without direct aid from the government.

In a land of tens of thousands of small farms, individual farmers would be at a disadvantage in marketing their products and in purchasing supplies. In fact, after the subdivision of the large estates, the small poorly equipped peasant farmers were unable to compete with the large well-equipped estates in the marketing of butter. They consequently received a lower price for their butter than did the estate owners. Thus the small-farm operators got together and established cooperative dairies, where they brought

their milk and where well-trained dairymen made high-grade butter. Since the organization of the first cooperative dairy in 1882, this system has grown until it now embraces practically all of the more important activities of the agricultural industry. More than 90 per cent of the Danish farmers belong to cooperative dairies and about 70 per cent are members of cooperative slaughterhouses. In addition, there are cooperative butter, egg, cattle, and seed export societies. There are also purchasing organizations, such as the societies for the purchase of feed and fertilizers. Mention should also be made of the "Cooperative Wholesale Society of Denmark," which is supported by the farm population and supplies merchandise to 1800 cooperative stores.

Why the Danish Cooperative System Has Succeeded

The success of the Danish cooperative system has been due in large measure to a number of factors. Altho the Danish farmers are individual owners of land and have a feeling of personal responsibility, they believe that real progress is realized thru cooperative efforts, that is, thru their ability to work together. The people trace back to a common stock of ancestry. They farm the lands that have been worked by their forbears, and in their respective communities have a good knowledge of one another. They emphasize the production of finished animal products rather than raw materials. Thru cooperative methods they realize a great advantage in producing high-grade standardized products. In addition, the Danes in general possess a high moral code, a sense of loyalty and good fellowship, native intelligence, and an excellent education.

In general, cooperation in the United States has not met with the success that it has found in Denmark, for several reasons. On the whole, the people of the United States have been too prosperous to place major importance upon minor savings. The average American is affected by the personal struggle to raise himself in the community and to utilize the rich opportunities of the country. Our philosophy stresses individual freedom of action. The population of our nation is of a mixed nature and in many districts lacks the community of interest that is essential to successful cooperative enterprises. In the rural areas our population is much less densely distributed than is the population of Denmark. There is consequently more land per capita. The soil is fertile, and therefore produces large yields. Consequently there is comparatively less incentive in the thousands of rural districts of America to think in terms

of cooperation. Finally, many people in the United States feel that there are times when those outside the cooperative societies get greater benefits than those who belong to them, especially during periods of prosperity.

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GEOLOGY AS A BASIS FOR ELEMENTARY SCHOOL GEOGRAPHY

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Need for Bases in Geography Interpretation

The relationship of man to his environment is geography. Each year the variety of these relationships increases, necessitating the inclusion of more relationships in elementary school geographies and a less comprehensive treatment of each. Day by day the complexity of our life in America becomes greater. Here and there, dams have permitted a type of agriculture, heretofore unknown in the region. Increasing marginal lands change the picture from grain farming to grazing. Feats of engineering allow man to live and work in this region, never before populated by the white race. There are many other changes, but needless to say, as years pass, more and more adjustments are becoming necessary in our changing environment.

Textbooks are prone to ignore these changes in the environment and the resultant adjustments required of man. An historical account of these environmental changes, and trends concerning changes which may come, together with man's adjustments, would undoubtedly become quite voluminous. This, however, does not justify the elimination of an explanation of the "whys" from the picture. Is it not feasible that children of the intermediate grades should have bases for the interpretation of these adjustments?

Geographies which are printed today present a story of how man lives in his various environments that is much different from those printed twenty-five years ago. The same statement will be true of geographies which will be printed twenty-five years hence. A people's adjustments to a geographical region are many and changing, yet the basic reasons for these adjustments remain somewhat constant. There is a geographical basis for the purchase of thousands of sheep from the Pueblo Indians by the Federal Government. The same geological basis may explain similar adjustments which have been made since man first lived on the earth. If children understand that soil on a slope erodes when vegetation such as grass, trees, and brush is removed, they will not only be able to understand the adjustment that the Pueblo Indians must make to their environment, but will also be prepared to interpret adjust-

ments of other peoples due to erosional difficulties. Then why shouldn't geology be used as one basis for elementary school geography?

A geological basis as one of the avenues of interpretation seems necessary for an appreciation of man's adjustments to his environments. More interpretation in geography would undoubtedly clarify and make more meaningful, the present offerings of intermediate grade textbooks. Children should be given bases for the interpretation of geographical changes which have occurred and which they observe and will continue to observe thruout life.

IS GEOLOGY USED AS ONE OF THE BASES?

A review of intermediate grade textbooks reveals only slight effort to develop interpretation in geography. The child may learn superficially what man's adjustments are at the present time, yet he learns little about the changes that have made these adjustments necessary, and has been given little basis for the interpretation of changes that have been made. Very little attention has been given to the geological basis for the interpretation of geography since the Tarr and McMurry intermediate grade geographies published in 1900 and 1910.[1] In the Tarr and McMurry Geographies, special emphasis was placed on the presentation of certain basic geological concepts as a background for the geography to follow.

The Thirty-Second Yearbook of the National Society for the Study of Education takes a definite stand relative to the "physical" basis for geography. The term "physical," however, is not clarified. Quoting from the Thirty-Second Yearbook, "The pendulum of interest and of effort may swing from one extreme to the opposite with changing interests of the leaders in the science or in education, but the fundamentals are unchanged. Man lives in a physical world with social contacts and relationships. Geography, in any phase of development, is not and cannot be a purely social subject. Its basis is physical in a broad way, and its superstructure can only be built as the base is made strong and complete."[2]

Dean George F. Kay of the University of Iowa in his Iowa section of the new Brigham and McFarlane geography, Our Home State and Continent, has taken a definite stand in regard to the re-

[1] Ralph S. Tarr, and Frank M. McMurry, New Geographies, P. V.

[2] National Society for the Study of Education, Yearbook XXXII, The Teaching of Geography. Section I, "Nineteenth Century Textbooks of Geography," by Albert P. Brigham and Richard E. Dodge.

lationship of geology to geography in the intermediate grades. Dean Kay gives a geological basis for the study of the geography of Iowa.

Study Made in a Typical School Situation

Purpose of the Study. During the spring of 1936, a study was conducted by the writer in the fifth grade of the Elementary School of the State Teachers College at Kirksville, Missouri, to determine the desirability of the use of geology as a basis for geography in the intermediate grades. The study was made to determine specifically, first, whether children of fifth grade level can interpret, with a geological basis, environmental adjustments, and secondly, whether the development of an ability to interpret from a geological basis, a situation in a given region, enables the child to interpret a similar situation in other regions.

Procedure. Since no geological material was available for children, it was necessary to write the material to be used. It seemed advisable to present in this geological background for geography, a study of the geological factors which are most commonly contributive in determining the variability of man's adjustments to environments. A background which would include the many phases of the different factors listed below was not attempted since it was thought too extensive. Children should understand the significance of streams at grade, but a detailed study of meandering streams is not necessary. The factors selected as most generally affecting the adjustments of man were, the formation of rocks, the formation of coal, glacial activity, how water changes the surface of the earth, how rocks are changed to soil, windblown soil, and underground water. The material was mimeographed and placed in the hands of the pupils.

The geological material was presented over a period of three weeks. Seven field trips were taken, one for each of the seven divisions. One-half day was taken for each of the seven trips. The two forms of the test were given as a pre-test, and after the material had been presented, the same two forms were given as a retest. This permitted a comparative study of the gains made on both forms of the test as an index to the improvement of ability to interpret environmental adjustments.

In testing to determine the ability of children to make geological interpretations of man's adjustments to his environment, the objective multiple-choice test was used. Two forms were constructed, Form I, which was designed to determine whether children of fifth

grade level can interpret, with a geological basis, environmental adjustments; and Form II, which was designed to determine whether the development of an ability to interpret with a geological basis, a situation in a given region, enables the child to interpret a similar situation in other regions. Form I was composed of thirty situations, each requiring a geological interpretation. Each of the thirty situations was supplied with four possible interpretations, only one of which was correct. These situations were representative of the different parts of the geological story. For each situation in Form I, there was a corresponding situation in Form II.

Test Results. A group of thirty-eight children, rather normally distributed, was used. The ranges derived from standard tests and given here, are indicative of a widely scattered group: I.Q., 75-139; C.A., 8-4—12-9; M.A., 7.5- —17.5; E.A., 10-0—18-10; and E.G., 4.1—8.9 The medians were as follows: I.Q., 104; C.A., 11-1; M.A., 11-1; E.A., 12-0; and E.G., 6.2.

There was a rather close correlation (+.64) between the ability of the pupils to interpret community situations and situations in other parts of the country as indicated by correlating the scores of each pupil on the two forms of the pre-test. The medians of the thirty possible scores on each Form of the pre-test was, Form I—12.67, and Form II—12.4. Considering the ability of the groups, the scores on the pre-test would be expected to be widely scattered but they were not. The average deviation was, Form I—3.32, and Form II—3.47. A graphical representation shows the scores grouped closely around the median.

There was a much closer correlation (+.92) between pupils' scores on the re-test. The medians of the re-test were, Form I —24.67, and Form II—24.0. The average deviations were, Form I —3.43, and Form II—3.47. The scores were again closely grouped around the medians. This, however, does not indicate that pupils can interpret a specific situation in a given region because they can interpret a corresponding situation in the community where the study was made. This correlation of +.92 merely shows a tendency of pupils to make similar scores on the two forms of the re-test or a greater tendency to interpret in both forms after the geological study. In recognition of the gains made on both tests, it is evident that the pupils' ability was greatly increased and almost equally increased as between the pre-test and the re-test of Form I and the pre-test and re-test of Form II.

The correlation of the ability of pupils to interpret correctly

corresponding specific situations in the community and specific situations in the other parts of the country was found to be +.24 between the two forms of the pre-test. Previous to the study of the geologlical material, there seemed to be little indication that the pupils would be able to interpret situations in a given region altho able to interpret situations in the community. The correlation between the two forms of the re-test was +.62. This shows a rather high correlation of the ability of pupils to interpret correctly corresponding specific situations in the community and in other parts of the country, after a study of the geological material. There was intentionally a sufficient lack of similarity between corresponding situations in the two tests relative to implications involved so that they were not exactly alike. This would tend to lower somewhat the correlation between the scores of the two tests.

A comparison of the mean scores of boys and girls in both tests of Form I and II are significant in this study. The fact that the boys' assimilation of geological concepts was evidently greater than that of the girls, altho the scores made on standard tests failed to predict any difference, indicates either that the material was more interesting to them or that it was less difficult for them. It may also indicate a lack on the part of the girls, before the study was made, of prevailing interests in outdoor life. This difference may often be noted between boys and girls of elementary school age, as well as later. That there is any appreciable difference, however, between boys and girls in their ability to assimilate and use interpretatively geological concepts is not demonstrated in this study.

The difficulty of the written examination in this study is realized. A free-response test which corresponded to the written examination was given to each child. Many of the children who made low scores on the writen examination were able to make correct oral interpretations. The inability of the pupils to make the correct selection of interpretations in the written examination was probably determined largely by reading disabilities and not by a lack of assimilation of the geological concepts. The pupils were unable to grasp clearly the situation presented, together with suggested interpretations. Progress in school is quite generally accelerated or retarded in relation to the reading comprehension of the pupil. The assumption is made here that the above-mentioned low score group was enabled to make the correct oral interpretations because of class discussion and excursions and not because of any appreciable comprehension of the reading material.

Altho this study was conducted in a single situation and under a carefully planned procedure, the results of the study are significant in themselves. They are rather broadly indicative of the results which might be expected in an ordinary situation with the written material and field trips at hand that were used in this study. To assume that all teachers of the intermediate grades of the elementary school are qualified to use the geological material prepared and used in this study is entirely too presumptuous. The geological concepts used here, however, are basic, and representative of the various regions of the country.

WHAT MAY WE CONCLUDE?

Several significant conclusions may be made as a result of this study:

1. After the study of specific geological concepts illustrated in one region there seems to be a high probability that the pupils will be enabled to interpret similar situations in other regions.

2. A study of geological concepts greatly increased the ability of the pupils to interpret geographical situations in the community where the study was made.

3. The excursions are considered to have been most helpful in establishing the proper geological concepts. They not only illustrated the written material but gave a variety of direct concrete illustrations of a single geological concept.

4. The performance of the boys in this study is considered significant considering that their scores on standard tests and other tests were consistently lower than those made by the girls of the class.

5. There is no appreciable difference noted between the ability of boys and girls to assimilate and use geological concepts in the interpretation of geographical siutations.

6. The oral response of the child in this study is a much better index of his ability to assimilate and use interpretatively geological concepts than is the written examination.

7. It seemed that there was not so much difficulty in getting the proper geological concept as there was in being able to comprehend the suggested interpretations in the written examination.

8. The geological concepts presented in this study are not too difficult for children of the intermediate grades, and a geological background may be highly recommended as a basis for the interpretation of geographical situations.

MANY DIFFERENT ACTIVITIES GREW OUT OF A STUDY OF FOODS

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A visit to a wholesale grocery store in order to determine the source of some of our foods, was one of the high lights of the year's work. The children were taken from room to room and shown shelves piled high with boxes and cans from every part of the world. They were especially interested in the numerous bags of green coffee, the great variety of nuts, dried fruits, foreign meats, pearl onions, the huge tea boxes from Japan, as well as the usual foods for sale.

The lack of customers leaving the store with packages made these fourth graders realize that this store was different from the retail grocery store across the street from their school. A visit to the banana ripening room impressed them greatly. The children were interested, too, in the coffee roasting machine and how it worked.

Questions Raised by Visit to Wholesale Grocery Store

As they left the store the teacher was given a can of caviar to take back to the classroom for a class treat. Of course, the children wanted to know what it was and from what country it came. Other questions were raised, such as:

Why does Mr. G. import dates? I saw orchards of them in California. Why doesn't he get them there?

Why does he buy fresh pineapples from Florida and canned pineapples from Hawaii?

Why does Mr. G. call "Nigger Toes," Brazil nuts?

Why does he buy so much food from foreign countries?

How does Mr. G. get meat from foreign countries? Why doesn't it spoil on the way to Milwaukee?

Why does Mr. G. have a banana ripening room?

Why aren't ripe bananas picked and shipped instead of green ones?

How is macaroni made? (A visit to a macaroni factory in Milwaukee answered this question.)

Does the United States raise any tea, coffee or olives?

CURIOSITY AROUSED

The unusual foods impressed the class so much that they wanted to know more about them. This interest led to the following study:

- Truffles from France
  - What they are
  - Where found in France
  - How hunted by peasants with pigs and dogs
  - Why very expensive
  - How served
- Cockcombs from France
  - What they are
  - How served
- Kangaroo tails from Australia
  - Why Australians eat kangaroo meat as Americans eat beef or pork
  - Why the tails are shipped
- Goose livers from Germany
  - Why bought from Germany or France
    - How the geese are overfed and raised in small pens to increase size of liver
  - How prepared for serving
  - Importance of liver as a food
- Bamboo sprouts from China
  - Why bamboo sprouts are ordered for Chinese restaurants in city
  - Other uses of bamboo

In each case the country from which the food was purchased was located on the map.

METHODS OF PRESERVING STUDIED

A large meat refrigerator in the wholesale grocery store stimulated an interest in other methods of preserving foods. This interest led the children to dry apples and pumpkins in the classroom, cook them in the domestic science room and eat them at a dinner party during the noon hour. The importance of drying foods during earlier times was determined. One of the city stores placed on display in the classroom an electric refrigerator and sent a woman from the educational department to answer the children's questions concerning it. The sixth grade children who were studying germs and bacteria were invited as guests.

Children Watch Fishermen

Children's interests vary. Another year when a different group of children visited the same wholesale grocery store, they were more interested in the fish than in the meat. The interest in fish led the teacher to arrange for a trip to a fishing wharf and a fish market in the city. There they watched the fishermen bring in their boats, unload the fish, mend their nets and put them away. Some of the fishermen talked with the children and answered their questions. The quaintness of the place impressed some of the children so much that later they sketched scenes of the fishing boats and boat-houses. The visit with the fishermen helped to develop greater respect for these sturdy men whose lives are full of danger. Parts of *Captains Courageous* by Kipling were read to the class, and a brief study of the fishing industry followed.

Sanitary Conditions Discussed

The discussion of the trips to food stores made the children aware of some of the efforts of the United States government to safeguard our health. The need for food inspectors and pure food laws was pointed out.

Some of the desirable things noticed in the food stores visited were: (1) no flies in the stores; (2) no food exposed to dust; (3) stores clean; (4) meat in refrigerator kept in separate compartment from ice.

Small Group Enterprises

The study of food provided for small group enterprises. One group became interested in making a collection of nuts. These were labeled and a short description written, telling their uses and where they were grown. Another group cracked a cocoanut and dried the meat. They learned whether the meat would dry quicker in Milwaukee than in the Philippines, the commercial value of copra, and the uses the natives made of the cocoanut meat, husks, and milk. A third group made a collection of spices and found the parts of the different trees used for spices, as well as the different countries from which spices are obtained. The class learned, too, that a need for spices had played an important part in encouraging the explorations which led to the discovery of America.

A School Garden

In the spring the class planted and cared for a garden and helped the new fourth grade harvest it in the fall. The class was given the task of plotting off the garden. In order to do this work as accurately as possible, a map was drawn to scale showing the various plots of vegetables and the paths between them. The importance of planting good seeds was discussed. Experiments with soil were made. Water was poured into flowerpots containing different kinds of soil to see which type would hold the most moisture. Then seeds were planted in the pots to determine the best soil. In order to see if the seeds were good, they were germinated before planting and germination tables consulted. The kinds of seeds eaten as food were listed and other parts of plants used for food determined. Curious insects that found their way into the garden and legends of some of the vegetables planted increased the interest in the garden. The following fall some of the vegetables were canned and given to the Family Welfare. The class visited the green market; talked with the farmers; learned the time they left home; where the farmers lived; the number of animals they kept; and saw some vegetables they had never seen before in their raw state.

China Studied as a Land of Farmers

China was studied as a land of poor farmers, and some of the reasons for the poverty of great masses of the Chinese people were determined as follows:

1. Crops often destroyed by floods and drought
2. Primitive methods of farming used
   How ancestor worship hinders progress
3. The population of China is very dense
   China compared with United States in area and population
   Graphs made showing that there are
      About 40 people on earth to sq. mi.
      About 100 people in China highlands to sq. mi.
      About 500 people in Shantung to sq. mi.
4. Farms are very small
   (a) Size of average farm in United States and China compared
   (b) An acre and a quarter of land on school ground measured off to show the size of Li's father's farm (*World Folks*, by Smith)

(c) Map of Li's farm made showing amount of rice, tea, and vegetables grown
(1) Determining why Li's father uses low flat land for rice and the steep hillsides for tea
(2) Determining why Li's father raises rice instead of wheat
Learning that the production of rice requires much patient labor
Seeing a motion picture of the rice industry in in the Hawaiian Islands showing how the Chinese (on the island of Oaku) operate their scarecrows in the rice fields, harvest, truck, and winnow rice

5. Many grave mounds decrease the area suitable for cultivation

CREATIVE DRAMATICS STIMULATED

The study of foods stimulated creative thinking which was expressed in many different ways. A group of children suggested, prepared, and gave an original tea pantomime in Japanese kimonos. One little girl, dressed as a grandmother, told the story of tea which was pantomimed by other children as it was told. The children had transformed the blackboard into a tea orchard from which the pantomimers picked imaginary tea leaves. The acts were as follows: (1) planting tea; (2) picking the tea; (3) firing the tea; (4) sorting the tea; (5) packing the tea; (6) drinking the tea.

Two other children gave an original dramatization in which they dressed as Japanese girls and discussed the queer Americans who spear their food, drink iced tea, shake hands, and sleep in high beds without fear of falling out.

The great interest in Japan led the children to present and explain in the assembly a series of tableaux representing phases of life in Japan: the doll festival; in a Japanese shoe store; Japanese mother and her baby; Japanese tea party; in a rice field; bed time in Japan. A puppet show, based on *Gemila, the Child of the Desert,* by Andrews, which they had read in connection with the study of dates and desert life, was given at the same time. Every boy and girl in the grade participated in this program and worked to make it a success.

GROWTH OF MANY ACTIVITIES

The art work connected with the puppet show and the Japanese tableaux was very vital. It required several months to make and

wire the puppet theatre and paint the needed scenery for the puppet show; to make and dress the puppets; to paint huge scenery as a background for some of the Japanese tableaux; to make costumes and stage properties and to experiment with the arrangement of scenes and colored lights until each scene was as effective as possible. Japanese songs were learned to be sung between scenes. In order to buy curtains for the room, the class decided to charge twelve cents admission to their show. Posters were made to advertise it. Many parents and practically the whole school attended the show which was given at the close of an afternoon session. The proceeds amounted to thirty-six dollars. The arithmetic involved in selling tickets, checking the amounts of the ticket sellers, computing the profit and the expenditure of this amount were real life problems. The following activities grew out of the expenditure of this amount:

Deciding to buy curtains for the room and figuring the number of yards of material needed if the teachers made the curtains

Bringing samples of curtain material to school and comparing the prices

Consulting the art teacher in regard to the best design and coloring for the room

Framing picture for room and determining type of frame needed

Figuring the money left after buying curtains and framing picture, and suggesting various ways of spending it

Finding out the need of the Mississippi flood sufferers and deciding to help them

Learning the different ways money can be sent to the Red Cross

Children Suggest Worthwhile Activities

Altho the study of foods covered a year's work, yet the children did not grow tired of it. Every trip was different and led to many varied activities. Then, too, the children suggested and carried out many activities which had not occurred to the teacher when planning the work. For example, the teacher felt that the children might be led to realize how other people are working for them, by visiting a green market, but she did not know that an invitation would be extended by the parents to visit a candy factory and a wholesale grocery store. Again, she thought an interest in rice or tea might lead to the dramatization of a story such as Lucy Fitch Perkins' *Japanese Twins* or to a Japanese party. She had no idea, however, that the interest in Japanese life would lead the class to suggest

and give in the Assembly Hall, tableaux representing different phases of life in Japan. She was surprised and pleased, too, when a group of girls asked to give, for the rest of the class, an original pantomime, showing how tea is prepared for us. How could she have known in advance that two of the most retiring but brightest children in the room would interest a group in giving a puppet show and use the proceeds for curtains for their room, and for the Mississippi flood sufferers? Nevertheless, she knew if the children's interest was sufficiently gripped that there would be many questions, problems and suggestions which would lead into all subjects. She welcomed worthy leads proposed by the children and entered whole-heartedly into helping children follow them. She realized, also, that the more she knew about the subject of food the better she would be able to detect possibilities in the children's interests and lead them into new fields that would challenge and fascinate them.

A STUDY GUIDE FOR THE TEXTILE DISTRICTS OF THE BRITISH ISLES

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The teacher should study the material offered here and adapt it to her own needs. Each child should be given a copy of the study guide and a map showing the coal deposits of the British Isles. This map can be traced from a textbook. If the teacher does not have a duplicating machine, the map and graphs can be put on the blackboard and the teacher can read the questions from the guide giving the children time to find the answers. However, this method is not advocated as it forces all of the children to work at the same rate of speed. The exercises in No. III are for those children who show interest. The teacher or pupils may suggest other worthwhile exercises. The summary exercises may be used for testing purposes. This study was prepared for pupils of the sixth grade.

I. References for children

1. Atwood-Thomas: *Nations Beyond the Seas.* Ginn and Co. Pages 28-29; 32; 33-34; Map showing coal deposits, page 22
2. Barrows-Parker: *Europe and Asia.* Silver Burdett Co. Pages 16-19; Fig. 12, page 11. Districts producing coal
3. Bodley-Thurston: *The Old World Continents.* Iroquois Publishing Co. Pages 8-11
4. Branom-Ganey: *Eastern Hemisphere.* William H. Sadlier. Pages 19-21. Map showing coal deposits, Fig. 14, page 18
5. Brigham-McFarlane: *Our Continental Neighbors.* American Book Co. Pages 89-92; 98. Map showing coal deposits, page 89, Fig. A
6. Huntington-Benson-McMurry: *Living Geography,* Book Two. The Macmillan Co. Pages 264-266. Map showing coal deposits, page 263, Fig. A
7. McConnell: *Living Across the Sea.* Rand McNally and Co. Pages 53-58. Map showing coal deposits, Fig. 55, page 59
8. Smith: *Foreign Lands and Peoples.* The John C. Winston Co. Pages 102-106; 109-110; 115. Map showing coal deposits, Fig. A, page 106
9. Smith: *Our European Neighbors.* The John C. Winston Co.

Pages 200-204; 207-208; 213. Map showing coal deposits, Fig. A, page 204

10. Stull-Hatch: *Europe and Europe Overseas.* Allyn and Bacon. Pages 14-16
11. Thralls: Keystone Geography Units, *The British Isles.* Keystone View Company. *A Cotton Thread Plant at Paisley, Scotland; A Bleaching Field Near Linen Mills, Belfast, Ireland; Sheep Near Thurso, Scotland; Liverpool from Birkenhead Showing Landing Stage; Manchester Ship Canal, Manchester, England*
12. Allen: *Europe.* Ginn and Co. Pages 40-54; or 82-91
13. Clark: *Europe.* Silver, Burdett and Co. Pages 317; 320-322; 323-327
14. Fairgrieve-Young: *Europe and the British Isles.* D. Appleton and Co. Pages 331-332; 354-361

II. Problem: To discover reasons which help explain why certain districts of the British Isles specialize in the manufacture of textile goods.

1. From previous study you should know the meaning of the word "textile." What does it mean? .....
.....
2. What kind of work would you expect to find people doing in the Textile Districts of the British Isles? .....
.....
3. Find the three leading textiles and the city especially noted for each.

Textile	City
.....	.....
.....	.....
.....	.....

4. Near each of these large cities are many smaller cities where people engage in the same kind of work. Near Manchester are Blackburn, Burnley, Bolton, Oldham, Preston, Rochdale and other smaller towns where cotton manufacturing is the chief work. Near Leeds are Bradford, Huddersfield, Halifax and other towns in which woolen manufacturing is the chief work. Near Belfast are smaller towns where linen goods are manufactured. Can you now explain why the title "Textile Districts" is used? .....
.....

5. Show these districts on a map showing coal deposits of the British Isles. Use a different color for each and be sure to explain the meaning of the symbols in the key.
6. This map now gives one reason for textile manufacturing in two of these districts. What is the reason? .....
.....
7. One of the oldest industries of Great Britain is woolen manufacturing. The first weaving was done in the homes of the people. From the references find two reasons why weaving got an early start in Great Britain.
(1) .....
.....
.....
(2) .....
.....
.....

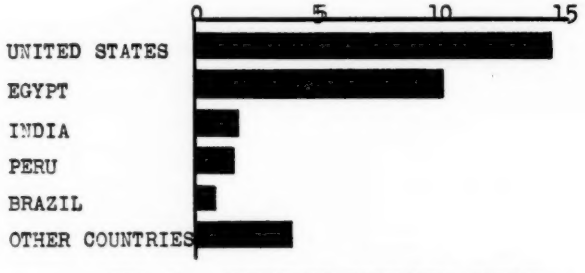

FIG. 1. COUNTRIES SUPPLYING COTTON
(Figures show hundred thousand bales. Five year average, 1927-1931. Source: Stamp and Beaver, p.490.)

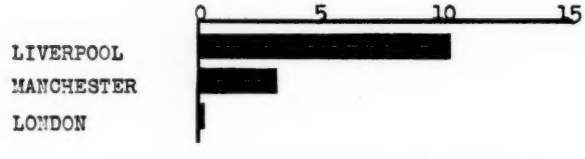

FIG.2. PORTS IMPORTING RAW COTTON
(Figures show million centals of 100 pounds Five year average, 1927-1931. Source: Stamp and Beaver, p. 487.)

8. Later with the introduction of machinery weaving was done in mills. What is shown on a physical - political map of the British Isles to suggest how the first mills in the Leeds district were run? .....
.....
9. How do the streams of the Pennines aid in the manufacture of textiles today? .....
.....
10. Many years ago many Flemish people immigrated to Great Britain. They were skillful weavers. Find in one of the references a statement which proves there are many skillful workers in the British Isles today. Copy the statement here. .....
.....
11. Is cotton raised in the British Isles? .....Why, or why not? .....
.....

12. Fig. 1 shows the countries which supply cotton to the British Isles. Which country supplies the greatest amount? .....
.....
13. What advantage is there in locating the cotton district on the west coast of Great Britain? .....
.....
14. Which port imports the greatest amount of raw cotton? (Fig. 2) ..... Which is second? .....
15. What makes it possible for ships laden with cotton to reach Manchester? .....
What symbol indicates this waterway on the physical-political map? .....
16. How do you account for Liverpool and Manchester ranking far ahead of London in the importation of cotton? .....
.....
17. In which district would you expect to find more moisture in the air, in Leeds or Manchester? .....
Why? .....
.....
18. This was very important in the early days because moisture in the air prevents the threads from .....
It is not so important today because factories are artificially humidified. Explain the meaning of "artificially humidified."
.....
.....
19. Why did linen manufacturing begin in Belfast? .....
.....
.....
20. How does spring water help in the manufacture of linen?
.....
.....
21. Belfast is not in a coal area. (See coal map) Where can Belfast obtain coal? .....
22. Who uses all these textile products that are manufactured in the British Isles? Study these tables, then write a summary statement. .....
.....
.....
.....
.....
.....

Countries Buying Linen Yarn and Manufactures from The British Isles

(Thousands of £'s Five year average 1927-31)

China	225
United States	3271
Brazil	291
Argentina	236
South Africa	227
India	274
Canada	951
Other Countries	2016

(Source: Stamp and Beaver, p. 512)

Countries Buying Cotton Piece Goods from The British Isles

(Million Sq. Yds. Five year average 1927-31)

India	1147
Egypt	126
China	124
Argentina	127
Australia	150

(Source: Stamp and Beaver, p. 499)

Countries Buying Cotton Yarns from The British Isles

(Million Lbs. Five year average 1927-31)

Germany	41
Netherlands	32
Switzerland	8
France	4
Belgium	6
India	18
Other Countries	52

(Source: Stamp and Beaver, p. 498)

23. We must not think of these districts as the only places where textiles are manufactured in the British Isles, but rather that these are the most important. Then, too, we must remember that other textiles are manufactured in the British Isles. Can you name two? ..... and ..... Also remember that there are other products manufactured in these districts; for example, Manchester is also a center for

the chemical industry. Give other examples. .....
.....
.....
.....
.....
.....

III. Additional Exercises

1. Make a graf to show that the woolen manufacturers of the British Isles do not depend entirely upon the home supply of wool for their factories.

Raw Wool (Millions of Lbs.)

Year	*Domestic Production*	*Imports*
1931	113	848
1932	119	918
1933	120	952
1934	114	789
1935	110	864

(Source: Foreign Commerce Yearbook, 1936, page 372)

2. The British are beginning to specialize in the manufacture of fine textiles because certain foreign countries, especially Japan, India, and China, are now manufacturing cheap goods and are "cutting in" on the British foreign market for cheap goods. How do the following tables prove there is competition abroad?

a. World Trade in Raw Cotton (Thousands of Bales)

	1910–14	1933–35
France	1440	1275
Germany	2142	1616
Japan	1405	3436
United Kingdom	4143	2548

(Source: Foreign Commerce Yearbook, 1936)

b. Export of Cotton Piece Goods from British Isles to India

(Thousand £)

1913	34,977
1935	7,490

(Source: The World Almanac, 1937)

c. Number of Cotton Spindles in Certain Countries (Active and Idle)

(In hundred thousands)

Year	1933	1934	1935	1936
United Kingdom	490	459	427	414
United States	309	309	301	281
India	95	96	96	97
Japan	82	91	99	109
China	46	47	48	50

(Source: Foreign Commerce Yearbook, 1936)

3. Draw a series of pictures of the textile districts emphasizing outstanding items in the landscapes. Do not label the pictures. Let the class decide which district is represented in the picture. For example, a picture showing cloth bleaching in the sun would represent the Belfast District.
4. Collect samples of woolen, cotton, and linen yarns and goods. Be able to tell the class where each is manufactured and several reasons why.
5. Here is a list of the ports which import raw wool: London; Liverpool; Hull; Southampton; Manchester; Goole; Grimsby. They are arranged in order of importance. Make a map of the British Isles showing these ports, and the location of the woolen district. Beside the dot which stands for the port put a figure 1 if the port ranks first, a figure 2 if second, etc. How do you account for London ranking ahead of Hull? Does the map suggest other questions to you? Have the class help you answer them.

IV. Summary Exercise

Here is a list of reasons which help explain textile manufacturing in one or more of the three leading districts. Read the list, then arrange the letters in the columns below. A letter may be used several times.

a. Pasturing of sheep on Pennine Uplands
b. The need of the people for clothing
c. An early start
d. The immigration of Flemish weavers
e. The location of the Manchester District in relation to the United States
f. The amount of moisture in the air

g. The deposits of coal
h. A large market for textile goods
i. Many skilled workers
j. A supply of soft water for washing, bleaching, and dyeing
k. The raising of flax
l. Transportation facilities
m. Available water power

Manufacturing woolen goods in the Leeds District is due in part to	Manufacturing cotton goods in the Manchester District is due in part to	Manufacturing linen goods in the Belfast District is due in part to

V. References for teacher

1. R. S. Atwood, Localization of Cotton Industry in Lancashire, England. *Economic Geography,* 1928, Vol. 4, pages 185-195
2. Blanchard and Visher: Economic Geography of Europe, pages 183-185; 185-186; 195-196. McGraw-Hill Book Co., Inc.
3. J. F. Bogardus, Europe, pages 226; 227-229; 248-250. Harper and Brothers.
4. Stamp and Beaver: The British Isles, pages 441-518. Longmans, Green and Co.
5. Bradford's Looms Whir With Britain's Reviving Trade. *The Christian Science Monitor,* Tuesday, Dec. 8, 1936
6. Manchester Mills Reopening to Meet Rise in British Trade. *The Christian Science Monitor,* Friday, Dec. 4, 1936
7. Van Valkenburg and Huntington: Europe, pages 305-306: 310-313. John Wiley and Sons.

SUGGESTIONS FOR TEACHING A PHASE OF THE BANANA INDUSTRY OF CENTRAL AMERICA

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The teaching of geography has in recent years been placing greater emphasis on two types of techniques which are certain to enhance its effectiveness. These two types are: visual presentation of geographic information, and the use of field work as an introduction to geographic problems.

The following outline for teaching a phase of the banana industry of Central America is offered as an illustration of the use of these methods at the junior high school level.

I. Interest lead
   A. Take the class to a fruit market, or designate a small committee to interview the manager of such a market. Secure answers to the following questions:
      1. Are there any common fruits which may be had fresh, and in prime quality, the year round?
      2. What is the source of these fruits?
      3. What steps are taken by the market to protect the freshness of these fruits?
   B. Discuss the data thus secured, with the class
      1. Oranges and bananas may be had fresh, the year round.
      2. Oranges come from California and Florida. Most bananas come from Central America, but others come from Mexico, Cuba, Colombia, and other nearby tropical lands.
      3. Bananas thus must come a much greater distance to our markets than oranges. (Have class use map scales.) Bananas must use water transportation over much of the way. Bananas are much more perishable than oranges, hence the supply of bananas needs frequent replenishing, because stocks must be maintained at a minimum.
   C. From the foregoing there arises the problem: How is it possible to keep our market supplied constantly with such perishable fruit, especially since it must come so far?
      The problem involves two elements:
      1. How is such perishable fruit kept fresh?
      2. How is a constant supply kept on hand, when obviously the fruit cannot be stored?

II. Activities essential to the solution of the problem

The best method available to meet this situation is that of selecting readings for individual reports by members of the class. For this purpose, the following sequence of topics is proposed, with suggested sources of material for each topic. References suggested are by no means the only ones available. Those not available in your local library, and for which you are unable to find substitutes, may possibly be secured from state libraries. (It would be advisable to assign the class as a whole the responsibility of finding, in the reported material, six facts which throw light on the problem they are trying to solve.)

A. Map of banana producing area in Central America. C. F. Jones, *Economic Geography,* p. 115.

This map may easily be copied on the blackboard, using bright colors to indicate significant data. The map reveals the first glimpse of the solution of the problem—the fact that the banana plantations are located on coastal lowlands easily accessible to the sea. (Incidentally, the map reveals many data concerning the kinds of lands where bananas grow.)

B. Following the discussion, perhaps occupying a separate class period, the teacher may present a good photograph of a growing and fruited banana plant. (Sources of such pictures are many. Fruit companies, Keystone slide No. 294, 1930 edition, the National Geographic Society, Washington, D.C., are among available sources.) It would be well to select a picture having in it a man, in order that some idea of the height of the plant may be gained.

Points which need to be stressed in the discussion accompanying the picture presentation:

1. The bunch of bananas is at the top of the stalk, and commonly is over twenty feet above the ground. A bunch of bananas frequently weighs as much as 100 pounds.
2. The stalk grows from a cutting in a little more than a year. The stalk, therefore, is fleshy and weak.
3. Storms are frequent in Caribbean lands. Since the banana plant is so constructed as to render it highly susceptible to strong winds, and since plantations must be near the coast and preferably on lowlands thus laying them open to high winds, fruit companies have had to select sites for plantations which are not frequently visited by storms accompanied by strong winds.

(It may be said by some proponents of "Child Activity" that the teacher should achieve all her ends thru this medium. Let it be noted that forceful presentation of colorful data such as the foregoing will be accompanied by much activity of mental character by the class.)

C. Map of a banana farm in Costa Rica. C. F. Jones, *Economic Geography,* p. 114. This map may also be enlarged on the blackboard. It will reveal a second factor in the solution of the problem—that banana farms are characterized by well-organized transportation systems. Tramway networks supplemented by muleback transportation between tramways, facilitate rapid movement of fruit from all parts of the farm to the main railway, which in turn leads to the port city. All tramways on the farm are directly tributary to the main railway.

D. The discussion relative to the layout of a banana farm may well be accompanied by a discussion of the activities carried on thruout the year on such a farm.

For this purpose the following reference is suggested: (Usable as a basis for teacher or pupil presentation.) Colby-Foster: *Economic Geography for Secondary Schools,* pp. 67-69.

This reference presents a graph of temperature and rainfall conditions in banana lands. The graph might well be placed on the blackboard, or the data from it dictated, and the class given some experience in graphic presentation of geographic data.

These data reveal the fundamental reason for the constant supply of bananas. Temperature and rainfall conditions being fairly uniform thruout the year, plantings may be so arranged that some fruit is ready for harvest at all times.

E. Equipment of the ports: (Alternative reference given.)

McConnell: *Living in the Americas,* p. 275

Atwood-Thomas: *The Americas,* p. 244

This material advances the problem one step further towards its solution. Port equipment is highly developed. Modern machinery makes loading and unloading operations very rapid and efficient.

F. The Nature of a banana ship.

Colby-Foster: *Economic Geography for Secondary Schools,* pp., 60-61

This report will bring out the following facts:

1. Banana ships are built for speed as well as carrying capacity.
2. These ships are equipped with both heating and refrigerating equipment, in order that all weather emergencies en route to market may be met.
3. Because of the speed of the boats, passengers frequently travel to Central America on them. This source of revenue helps pay the cost of the banana journey.

G. America's leading banana port.

J. R. Smith: *American Lands and Peoples,* p. 118

This brief source makes clear why New Orleans leads as a banana port, the reason being that much of interior United States may secure its bananas more quickly thru this point than thru any other.

H. It is advisable at this point for the teacher to conduct a summarizing discussion, out of which will emerge the following facts, each of which helps solve the problem upon which this series of exercises is based:

1. The banana producing areas have been developed near the sea on accessible coastal lowlands.
2. A banana farm has a highly organized transportation system, which is tributary to railways leading to port cities.
3. Banana exporting ports are equipped with radio stations for receiving news of the coming of banana ships. Exporting and importing ports are equipped with machinery which greatly speeds up the loading and unloading process.
4. Banana ships are fast-moving craft. They are equipped with heating and refrigerating apparatus, in order to correct for temperature changes encountered en route to market.
5. Banana lands have a year-round growing season, with heavy rainfall every month. For these reasons, the banana plant knows no season, and some fruit is harvested every week of the year.
6. Bananas destined for the various parts of the United States are imported thru several ports. New Orleans imports more bananas than any other, because a larger part of the United States may be served quickly from this port than any other.

It is for the foregoing reasons that fresh bananas may be found in our market at all times of the year.

THE WORLD'S FIBER PROBLEMS: A LABORATORY EXERCISE

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It seems to the author that a teacher in a teachers college should make an earnest effort to use varied methods in the presentation of material, mainly of course to demonstrate good teaching as well as to talk about it.

The unit outlined in this paper may be developed in a variety of ways. It has been used several times with worth-while results as a laboratory exercise.

The unit as given below is about as it was originally outlined by a group of students who prepared it for their class to use.

Recently in preparation for working out this unit a group of the class gathered from varied sources, as the bookshelves and files of the department, the college library and adjacent city libraries, a wealth of reference material. This material was sorted out and arranged under different headings. This group also worked out topical outlines that would be helpful in selecting material relevant to the problems raised in the unit. Two are given below.

The recitation and study periods were at first spent in research work in the department where the materials provided could be most conveniently used. Additional material was brought in by members of the class. The number of periods allotted to this depends upon the time given to the course as a whole.

The next phase of the work was conducted in part by volunteers from the group. Those who had had any difficulties in finding needed facts asked for help. Members of the class have the needed information or, better, the source where it could be found.

Another selected group of students, who had had the task of finding pertinent articles in recent newspapers and magazines, reported on their findings to the class at this time often answering some special inquiry. Some additional material was given by the instructor.

When the class work on the unit was completed a time limit was set for the passing in of a written report showing the completed unit. If a piece of work of this kind is to be graded the grade given should be based not only on the completeness of the work done but on the originality shown in use of material.

A laboratory exercise carried thru all the phases outlined here has unique values. It is the best possible training in the use of a wide range of reference materials. It brings out the need of ability to concentrate. It shows up honesty of effort and reactions to a new type of work. It puts a premium on the ability to write a logically thought out and well organized piece of constructive writing.

FIBER UNIT

Main Problem.

The problems of the fiber world are of serious international and domestic concern.

A. *Cotton.*

What effects have America's cotton problems upon the world's cotton industry?

B. *Wool.*

Why do the difficulties arising from the distribution phase of the wool industry seem more serious than those arising from its production phase?

C. *Silk.*

Why are the domestic problems of the silk industry usually more important than its international problems?

D. *Synthetic Fibers.*

Why are synthetic fibers problem-making as well as problem-solving?

E. *Minor Fibers.*

What problems hinder the minor fibers from holding more important places in the fiber world?

TOPICAL OUTLINES

Cotton

I. Raw material
  1. Distribution
    a. causes
    b. problems
  2. Markets
    a. cotton exchange
    b. problems
II. Manufacturing
  1. World areas
    a. determining factors
    b. problems
  2. World markets
    a. nature of
    b. problems

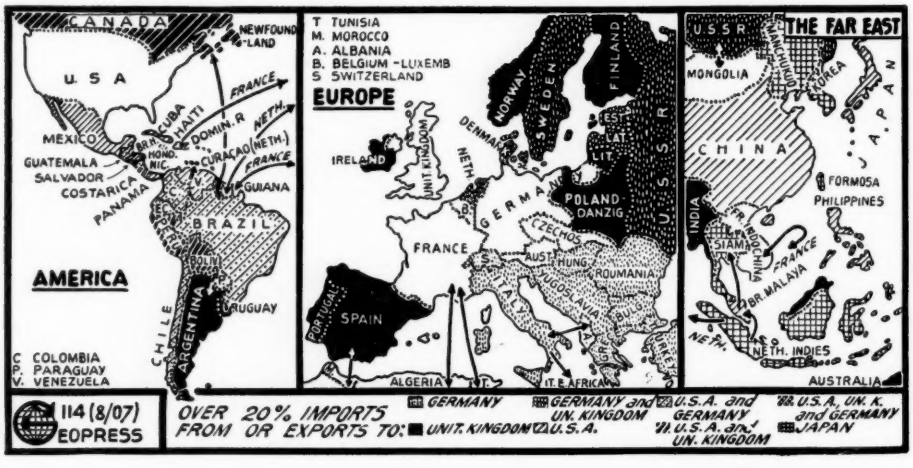
Synthetic Fibers

I. Locations of the industry
II. Raw materials
  a. sources
  b. national and international problems
III. Manufacturing problems
IV. Markets
  a. national and international problems
V. Importance of the industry
  1. Silk vs. rayon

EDITORIAL NOTES AND NEWS

On May 21, 1937 four Russian scientists were established in a camp at the North Pole to gather scientific data that might be of value to U.S.S.R. in developing its vast arctic area. However, the ice gradually moved in a southwesterly direction carrying the men approximately 1550 miles to a point near Scoresby Sound, Greenland, where the party was rescued from the disintegrating ice by Russian vessels sent for the purpose. The party had spent only two days less than nine months on the arctic ice. It is probable that the scientific findings will constitute an important contribution to knowledge of magnetic disturbances, weather conditions, ocean currents and drifts, and ocean depths in the arctic region. (Also see the JOURNAL for January, page 37.)

The struggle for commercial leadership among the great nations of the world continues. Each of the great productive or surplus consuming nations is vitally concerned over markets for its surplus products or for products that it does not produce but wants. If the share of the imports or exports of a country amounting to at least 20 per cent of the total of another be taken as a measure of commercial expansion, the accompanying map (1936) presents an interesting picture of the struggle for world markets.



In Europe the struggle is essentially a duel between Britain and Germany. Practically all of southeastern Europe as well as Italy and Switzerland are under the influence of the German export trade. Only Albania is dependent on Italy. Great Britain counted in its sphere of influence Ireland (Eire), Spain, Portugal, Norway, Finland, Lithuania, Poland, and Danzig. In 1936 the Germano-British fight for commercial power was undecisive in Netherlands, Denmark, Sweden, Estonia, and Latvia. Owing to a different economic structure the data for U.S.S.R. have no absolute value but Britain and Germany appear to have exceeded the 20 per cent. France appears to be excluded from the struggle as it maintains its commercial pre-eminence only in its own colonies.

In the Far East, United States and Japan are in the fore. The United States leads in the Philippines, China, Japan itself, and shares British Malaya with Netherlands Indies. Japan is extending its commercial position in Korea (Chosen), Formosa, Manchukuo, Siam and Netherlands Indies. The commercial leadership of Britain in the Far East is now confined to its possessions (except Malaya). The same is true of France in Indo-China and of the U.S.S.R. in Mongolia.

In America, the United States is the decisive factor only in Mexico, Honduras, Panama, and Cuba. It shares its commercial influence with Britain in Canada, British Honduras, Dominican Republic, Peru and Bolivia. German rivalry of the United States is increasing in Brazil, Chile, Ecuador, Colombia, Nicaragua, Salvador and Guatemala. Britain maintains its dominant position in Argentina and Uruguay.

GEORGE J. MILLER, State Teachers College, Mankato, Minnesota, and Editor of the JOURNAL will serve as visiting professor of geography, Teachers College, Columbia University, during the summer session of 1938.

G. E. HARDING, State Teachers College, California, Pennsylvania, will conduct a field study thru Europe, under the auspices of the college, from July 26, to September 4, 1938. This is the first time that the college has offered such a study abroad.

Two aquaria, the world's largest, are nearing completion at Marineland, Florida, eighteen miles south of St. Augustine, on the new Ocean Shore Boulevard. Sponsored by Marine Studios, the enterprise aims to duplicate, as far as circumstances allow, conditions existing in the open sea. Many thousand species of aquatic life will be brought together in the tanks where various sea grasses, sea weeds and coral gardens provide escapes in the inevitable struggle for existence. A specially built ship is used to transport the larger species whose capture alive without injury has been made possible by hypodermic drugging, similar to the hypodermic bullet used in capturing gorillas alive. The drug will knock out a shark in a very brief time but leave no hang-over. In this semitropical setting, with its high average of sunny skies, its abundance of clear sea water to enhance visibility, with one rectangular and one circular tank so constructed as to facilitate undersea motion picture work, visitors, scientists, and motion picture operators may view the exhibits at four different levels. Overnight accommodations and recreational facilities for visitors are provided nearby.

Southwestern National Monuments is the title of a new folder issued by the Department of the Interior, National Park Service. The folder includes four outline maps, brief descriptions and sketches typical of each of the twenty-six national monuments.

A number of pamphlets, clearly and simply written for the lay reader, and excellently illustrated, have been prepared by the Soil Conservation Service, United States Department of Agriculture, and are free to schools. These publications are listed in a six page catalog, dated January 1, 1938.

GEOGRAPHICAL PUBLICATIONS

Ellsworth Huntington. **Season of Birth. Its Relation to Human Abilities.** 480 pp. 8 maps. About 600 graphs. John Wiley and Sons. New York. 1938. $3.50.

Season of Birth is a scholarly study of widespread interest. It contains a vast amount of evidence from all parts of the world bearing on the significance of the seasons on human reproduction. Altho the factual materials are statistics, the data are presented not in tables but in hundreds of readily comparable graphs. The discussion and conclusions are attractively written.

Season of Birth is of value to teachers of geography in at least four ways. It reports extensive, highly original, profound research on environmental influences. It illustrates how diverse may be the factual material of value to geographers. It shows that research involving a huge mass of statistical data can be made readily understandable if enough thought and effort are expended. Finally, the conclusions are of deep, practical significance.

Space limitations permit of mention of only two conclusions. Seasonal influences clearly affect the survival rate in all stages, the sex ratio, and the proportion of people possessed of superior energy and ability. The optimum temperature for physical health (about 64°) and the optimum for mental activity (about 52°) are generally those most advantageous for conception and birth. These optima appear to have become established as those prevailing during the months most favorable to birth among our early ancestors.

Season of Birth will still further increase Dr. Huntington's already great reputation as a persistent seeker after the significances of the environment and as one who earnestly strives to make his discoveries widely useful by using great care in presenting them effectively and interestingly.

STEPHEN S. VISHER

Indiana University

Seventh Annual Picture Calendar, 1938. The Scotsman. 52 pp. Published by John Ritchie and Co., at the office of the Scotsman, 24 North Bridge St., Edinburgh.

Each page features an attractive scene, 11 by 8½ inches, artistically photographed, appropriate for each week that it presents in the calendar and verse at the bottom of the page. The scenes are typical of the English and Scotch countryside: simple farm life; fishermen and their crafts and nets; village streets and their old buildings; roadways bordered by streams, mountains, trees, flowers; incidents associated with the coronation; glimpses of castles reminiscent of some bit of history or literature.

Sophia Saucerman. **International Transfers of Territory in Europe,** with names of the affected political subdivisions as of 1910-1914 and the present. Department of State Publication No. 1003. 244 pp. + 6 map plates. Superintendent of Documents, Washington, D.C. 1937. $1.25.

Textual and tabulated statistical information based upon official publications of the countries involved. The maps, prepared by the author from manuscript and published sources, show the former and present international boundaries and the boundaries of certain political subdivisions. An excellent source volume for geographical and historical students.